

UMTRI

RESEARCH REVIEW

• UNIVERSITY OF MICHIGAN TRANSPORTATION RESEARCH INSTITUTE • APRIL-JUNE 2010 • VOLUME 41, NUMBER 2 •



on page 1:

Improving Commercial Vehicle Safety

Inside:

Texting Ban	3
Safety Research in 3-D	4
UMTRI Reorganization	5
M-CASTL 2010 Conference	6
Names & Faces	7
Recent UMTRI Publications	8
Conferences & Events	9

UMTRI RESEARCH REVIEW

• UNIVERSITY OF MICHIGAN TRANSPORTATION RESEARCH INSTITUTE • APRIL-JUNE 2010 • VOLUME 41, NUMBER 2 •

ISSN 0739 7100

UMTRI Director: Peter F. Sweatman

UMTRI Associate Directors: Jean T. Shope, Lawrence Schneider

UMTRI Business Administrator: Cathy Seay-Ostrowski

UMTRI Business Development Manager: Todd Anuskiewicz

UMTRI Library Head: Bob Sweet

Writer and Editor: Joyce Daniels

Designer: Carol Sweda, U-M Printing Services

Cover Photography: Joyce Daniels, UMTRI

Printer: U-M Printing Services

The UMTRI Research Review is published four times a year by the Research Information and Publications Center of the University of Michigan Transportation Research Institute, 2901 Baxter Road, Ann Arbor, Michigan 48109-2150 (umtri.umich.edu). To subscribe, see the subscription form on the inside back cover. For change of address or deletion, please send us your address label or email umtri@umich.edu.

The University of Michigan, as an equal opportunity/affirmative action employer, complies with all applicable federal and state laws regarding nondiscrimination and affirmative action, including Title IX of the Education Amendments of 1972 and Section 504 of the Rehabilitation Act of 1973. The University of Michigan is committed to a policy of equal opportunity for all persons and does not discriminate on the basis of race, color, national origin, age, marital status, sex, sexual orientation, gender identity, gender expression, disability, religion, height, weight, or veteran status in employment, educational programs and activities, and admissions. Inquiries or complaints may be addressed to the Senior Director for Institutional Equity and Title IX/Section 504 Coordinator, Office of Institutional Equity, 2072 Administrative Services Building, Ann Arbor, Michigan 48109-1432, 734-763-0235, TTY 734-647-1388. For other University of Michigan information call 734-764-1817.

The Regents of the University

Julia Donovan Darlow, Ann Arbor
Laurence B. Deitch, Bingham Farms
Denise Ilitch, Ann Arbor
Olivia P. Maynard, Goodrich
Andrea Fischer Newman, Ann Arbor
Andrew C. Richner, Grosse Pointe Park
S. Martin Taylor, Grosse Pointe Farms
Katherine E. White, Ann Arbor
Mary Sue Coleman, *ex officio*

UMTRI's Strategic Intent

To be the leader in transportation systems research integrating vehicles, people, and infrastructure to achieve a highway transportation system where:

- Fatalities and injuries are eliminated
 - People and goods flow efficiently
 - Reliance on nonrenewable energy is reduced
-

Improving Commercial Vehicle Safety

UMTRI researchers evaluate program to improve safety of commercial trucks and buses

UMTRI researchers are playing a key role in a new, nationwide system to improve large-truck and bus safety. The initiative, Comprehensive Safety Analysis 2010 (CSA 2010), is led by the Federal Motor Carrier Safety Administration (FMCSA), which plans a full rollout of the program in the coming year.

CSA 2010 is designed to improve upon FMCSA's current system used to monitor the safety of motor carriers, or fleets of commercial trucks and buses, and take follow-up action when necessary. The program's operational model, the Safety Measurement System (SMS), will eventually replace the current monitoring and enforcement model, called SafeStat.

During the past two years, researchers in UMTRI's Vehicle Safety Analytics Group have been conducting an independent evaluation of the CSA 2010 operational model. Assistant research scientist Paul E. Green leads the project for UMTRI with assistance from associate research scientist Daniel Blower. The researchers are evaluating quantitative and qualitative data from field tests being conducted in six states—Colorado, Georgia, Missouri, New Jersey, Montana, and Minnesota. They're evaluating the new operational model to determine its effectiveness, or potential for improving safety, and its efficiency, or impact on resources.

For the evaluation, FMCSA divided motor carriers into two groups, including a test group of carriers using the

new system and a control group of carriers using the old system. Data comes in the form of crash-rate statistics, records of interventions, and subsequent actions. The UMTRI project is also comparing costs of the two programs.

"It's all about safety and utilizing FMCSA resources more wisely," says Green. "In addition to comparing costs, we're comparing the safety behavior of test carriers under the new system with the safety behavior of control carriers under the old system following an FMCSA intervention. We're looking closely at crash rates—the gold standard of safety."

FMCSA will use results of the UMTRI evaluation to fine-tune its methodology.

"They want to see whether the new system effectively identifies unsafe carriers, what interventions are being done, and whether the interventions result in significant safety improvements," says Blower. "The question is, is the new system doing a better job than the old system?"

Under the current system, SafeStat combines data on crash rate, selected roadside inspections and traffic violations, and compliance reviews from the previous thirty months to produce a score. If the SafeStat score is greater than 225, a carrier is identified as "at risk," or requiring interventions to



JOYCE DANIELS/UMTRI

improve safety.

The process culminates in a compliance review conducted by FMCSA. Compliance reviews are "similar to an IRS audit," explains Blower. "They're very intense." The process is also resource-intensive. The administration conducts compliance reviews on only about 17,000 of the 700,000 active motor carriers in the United States.

In contrast, CSA 2010 identifies carriers for interventions at a lower threshold, allowing FMCSA and its state partners to contact a larger number of carriers earlier in the process. The goal is to identify and address safety problems before crashes occur. The system takes into account all safety-based roadside inspection violations, not just out-of-service violations, as well as state-reported crashes, using twenty-four months of performance data.

The Safety Management System (SMS) then assesses each carrier's

continued...

Continued from page 1

safety performance in seven categories, called Behavior Analysis and Safety Improvement Categories, or BASICS. The BASICS represent behaviors and conditions that can lead to crashes. The seven BASICS are as follows:

- Unsafe driving
- Fatigued driving
- Driver fitness
- Controlled substances/alcohol
- Vehicle maintenance
- Cargo-related
- Crash indicator

Like SafeStat, the SMS converts each carrier's BASIC measures into percentiles based on rank relative to peers. If the score exceeds the minimum threshold, the carrier receives a warning letter, the first of seven graded interventions, which range from warning letters to comprehensive onsite investigations. Once contacted, carriers can then access their case online and take appropriate action. One intervention, for example, encourages carriers to develop a Cooperative Safety Plan that presents details of what actions will be taken to address unsafe practices.

According to Green, this incremen-

The goal is to identify and address safety problems before crashes occur.

tal series of interventions is a significant change from the old system.

"FMCSA is touching many more carriers with the new system, since warning letters cost only the price of postage," says Green. "This was one of the major goals of CSA 2010—to contact carriers who have never before had any contact with FMCSA."

According to Green, preliminary data from the UMTRI evaluation suggests that the new system does, in fact, identify high-risk carriers. Next steps in the UMTRI project are to evaluate the effectiveness of individual interventions by determining if carriers improve following contact by FMCSA.

The UMTRI evaluation of the CSA 2010 operational model is scheduled for completion in December 2010. [RR](#)



JOYCE DANIELS/UMTRI

Texting Ban a Wake-up Call for Drivers

A new ban on texting while driving in Michigan makes it a primary offense to send, type, or read text messages or e-mails while driving, starting July 1. With bans recently approved in Michigan and Wisconsin, half of all states now ban texting while driving.

The legislation is a significant step in the right direction, according to research professor Paul A. Green, head of UMTRI's Driver Interface Group. Green provided congressional testimony twice in Lansing during the past year on the dangers of distracted driving.



“The legislation should help reduce distraction crashes and bring attention to this important issue,” says Green. He emphasizes, however, that texting is only one form of driver distraction. Talking on cell phones or programming electronic devices, such as MP3 players or navigation systems, can also divert drivers' attention.

Green uses the word workload to refer to any activity that engages a drivers' attention and adds to the visual, auditory, manual, and cognitive effort required to drive safely. Green and colleagues are working on developing equations to predict driver workload in real time and to identify the specific attributes of tasks that interfere with driving.

In experiments using UMTRI's driving simulator, the researchers have exposed subjects to conditions where workload varies. Afterward, Green explains, they can connect the results to factors such as distance to the lead vehicle, acceleration and deceleration, amount of traffic, and

the characteristics of road geometry, such as lane width and lane curvature.

“We can use the data in real time to figure out what a driver can do safely,” says Green. “By figuring out what drivers have to do, we can calculate what additional tasks they might be capable of.”

Quantifying workload will make it easier to compare assessments across studies so that researchers know if drivers were exposed to similar conditions. Right now, Green says, a yardstick for making cross-study comparisons doesn't exist.

He added that results of the research can also be used to help engineers design roads that reduce driver workload.

To hear more about Paul Green's research, listen to a podcast produced by the University of Michigan. Go to <http://www.ns.umich.edu/podcast/podcast.php>

Watch a video produced by CBC Television's Marketplace program, which enlisted Green to oversee a road test examining the potential distractions of GPS. See http://www.cbc.ca/marketplace/2010/gps_distraction/main.html

RR

The National Highway Traffic Safety Administration (NHTSA) reports that nearly 6,000 people died in 2008 in crashes involving a distracted driver, and more than half a million were injured.

Source: U.S. Department of Transportation website on distracted driving. For more information, visit www.distraction.gov

3-D Images Enhance Safety Research

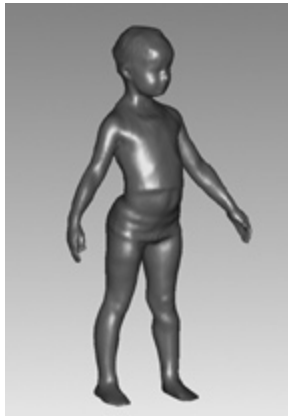
A whole-body laser scanner, purchased as part of a cooperative agreement with the National Highway Traffic Safety Administration (NHTSA), now complements UMTRI's state-of-the-art safety research equipment.

UMTRI's Biosciences Group will use the scanner to take detailed, three-dimensional surface measurements of the human body. The data will be used in ongoing research to develop new design guidelines for crash dummies representing child passengers, ages three, six, and ten.

Children this age comprise a vulnerable group, explains UMTRI research associate professor Matthew Reed. According to Reed, half of all back-seat vehicle occupants are children twelve and under, but most vehicles are not designed to provide good seatbelt fit for their body size. UMTRI's new laser scanner will be used to make accurate measurements of body shape and size for children in this age range.

"Our near-term goal is to gather data on three-dimensional body shapes of children in automotive-seated postures," said Reed. "The objective is to provide new design guidelines for crash dummies so that they will better represent child anatomy. Better dummies will provide improved assessments of restraint systems, leading to safer cars."

The measurement process doesn't take long. The scanner, which evokes the image of a transporter device from *Star Trek*, employs four laser beams that travel vertically, taking a whole-body scan in twelve seconds. The scanner assembles up to 500,000 three-dimensional surface-location



A three-dimensional image of a child demonstrates the laser scanner's output.

UMTRI BIOSCIENCES GROUP

measurements into a computer representation of the body shape.

The laser scanner represents a significant improvement over previous methods of gathering body-surface data, said Reed. One of these methods involved using a hand-held laser wand to produce a three-dimensional image of the subject. The process took twenty minutes, which made it impractical to use for child subjects.

Reed and Sheila Ebert-Hamilton lead a team that will use the scanner in research to begin this summer. **RR**

Woodrooffe coauthors NRC study on commercial vehicle fuel economy

A new congressionally mandated report from the National Research Council, with three University of Michigan researchers among the authors, evaluates various technologies and methods that could improve the fuel economy of medium- and heavy-duty vehicles, such as tractor-trailers, transit buses, and work trucks.

The report also recommends approaches that federal agencies could use to regulate these vehicles' fuel consumption. Currently there are no fuel-consumption standards for such vehicles, which account for about 26 percent of the transportation fuel used in the United States.

Dennis Assanis, Energy Institute director, John Woodrooffe, an UMTRI research scientist, and Martin Zimmerman, a clinical professor at the Ross School of Business, are among the authors.

The report, *Technologies and Approaches to Reducing the Fuel Consumption of Medium- and Heavy-Duty Vehicles*, is available on The National Academies Press website. See http://books.nap.edu/openbook.php?record_id=12845&page=RI **RR**

Reorganization Aligns UMTRI with New Opportunities

UMTRI has transitioned to a new organizational structure that replaces research divisions with a more flexible arrangement of groups and initiatives. The new structure permits broader integration of UMTRI's skills drawn from the physical sciences and the social sciences and poises the organization to more effectively pursue future opportunities.

"We have given more prominence to highly skilled research service groups, such as the Transportation Data Center and Engineering Systems, which were previously contained within research divisions. Some of our stakeholders were unclear about our commitment to these capabilities, which they value highly," said UMTRI Director Peter Sweatman.

"I am particularly excited about the potential of the research initiatives we have underway. They demonstrate our aspirations for wide collaboration across the U-M, policy relevance, and a global perspective. I am confident that these initiatives will help us further develop our organization and launch larger research centers with the potential for greater societal impact from our research," he added.

The new structural realignment is part of a broader strategic planning effort that began in 2009 with participation from faculty and staff, input from more than thirty stakeholder organizations, and the guidance of UMTRI's External Advisory Board. UMTRI is now composed of the following ten groups: Behavioral Sciences, Biosciences, Driver Interface, Engineering Systems, Human Factors, ITS Integration, Transportation Data Center, Vehicle Safety Analytics, Vehicle Systems and Control, and Young Driver Behavior and Injury Prevention.

Initiatives include the Center for Injury Prevention among Youth (CIPY), Commercial Vehicle Research and Policy, Michigan Center for Advancing Safe Transportation throughout the Lifespan (M-CASTL), Naturalistic Driving and GIS Data, Sustainable Mobility and Accessibility Research and Transformation (SMART), and Sustainable Worldwide Transportation.

New Initiatives Emerge

As part of the institute's reorganization, UMTRI's Advisory Committee approved two new initiatives addressing commercial vehicle research and policy, and naturalistic driving and GIS data.

The **Commercial Vehicle Research and Policy** (CVRP) initiative unites more than a dozen UMTRI faculty who conduct research on trucks and buses. Their commercial-vehicle research projects have significant implications for transportation economics, safety, energy use and emissions output, and policy development.

The most important objective of the initiative, says facilitator John Woodrooffe, is to foster communication among UMTRI truck and bus researchers, other university units, and, eventually, researchers on an international level.

For more information about the CVRP initiative, see www.umtri.umich.edu/divisionPage.php?pageID=295

Naturalistic Driving and GIS Data is a new initiative in UMTRI's Engineering Systems Group, led by David LeBlanc. Naturalistic driving studies include field operational tests of safety technology as well as at-risk population studies.

UMTRI has developed large driver-vehicle databases since the mid-1990s, which include data from both passenger-vehicle and heavy-truck studies. The data help researchers answer specific questions about the systems being tested (e.g., adaptive cruise control), but also contain a rich resource of general driving data on more than 450 drivers, representing how people drive in the real world.

The analysis of naturalistic driving data is becoming a method of great interest outside the technology arena and is being put to use in the study of at-risk populations such as younger and older drivers and those drivers with specific risk factors, such as disease. The method is also contributing to the study of driving with new powertrains such as extended-range electric vehicles.

For more information, visit <http://www.umtri.umich.edu/divisionPage.php?pageID=292> 

M-CASTL Transportation Research and Education Conference

Twenty-five experts concerned with the safety and mobility of young drivers and older adults highlighted the 2010 Transportation Research and Education Conference, sponsored by the Michigan Center for Advancing Safe Transportation throughout the Lifespan (M-CASTL). This year's conference, held at the University of Michigan (U-M) on April 7, included speakers and moderators from ten states and attendees from many more.

Dr. Mark M. Banaszak Holl (associate vice president-physical and natural sciences, U-M Office of the Vice President for Research) opened the conference with a discussion of M-CASTL's efforts to promote collaboration among U-M researchers, private industry, nonprofits, and governments. Nationally recognized experts Dr. Joe Grengs (assistant professor, U-M Taubman College of Architecture and Urban Planning) and Dr. Sandra Rosenbloom (professor of planning and adjunct professor of civil engineering, University of Arizona) gave keynote addresses.

The multidisciplinary conference featured six educational sessions:

- Emergency Medicine, Trauma, and Transportation
- Mobility Management and Transitions from Driving to Non-Driving
- Commercial Driver Issues
- Law Enforcement and Transportation
- Medical Conditions and Transportation
- Technology and Transportation



M-CASTL director David W. Eby welcomes conference participants.

Many faculty from UMTRI presented research and moderated panel sessions. M-CASTL director David W. Eby presented "Dementia and Driving" in the session on Medical Conditions

and Transportation. In the session on Mobility Management and Transitions from Driving to Non-Driving, SMART managing director Susan Zielinski presented "Mobility (and Accessibility) Trends and New Approaches for Transitioning to Non-Driving in an Urbanizing World," and M-CASTL assistant director Lisa Molnar presented "Mobility Patterns, Preferences, and Trade-offs."

Associate research scientist Daniel Blower moderated the session on Commercial Driver Issues. In this session, associate research scientist Jim Sayer presented "Technologies to Help Truckers Drive Safely."

Assistant research scientist Jonathan Rupp moderated the session on Technology and Transportation. In this session, research scientist Ralph Robinson presented "Issues Using Handheld Devices for Safety Applications." Research scientist Lidia Kostyniuk presented "Capturing Multi-Vehicle Kinematics: An Automated Site-Based Video Tracking System." Assistant research scientist David LeBlanc presented "Integrated Vehicle-Based Safety Systems (IVBSS): A Crash Avoidance Field Operational Test."

M-CASTL, based at UMTRI, is devoted to "safety and mobility throughout the lifespan," with a special emphasis on young people and older adults. The 2010 M-CASTL conference offered an opportunity for researchers, practitioners, industry people, government people, and students to learn from one another and collaborate on issues related to safe mobility across the lifespan.

For more information, visit the M-CASTL website. See <http://m-castl.org/node/70> 

Students to Promote Road Safety in South Africa

A group of undergraduate students from the University of Michigan visited UMTRI recently in preparation for a four-week trip to South Africa. Fifteen students will make the trip in July. Their international mission is to promote road-safety awareness among children and youth through community-based learning activities.

The students are part of the Global Intercultural Experience for Undergraduates (GIEU) at U-M. They're majoring in a variety of academic subjects, including psychology, aerospace engineering, accounting, and communications, among others.

UMTRI assistant research scientist Oliver Page will lead the four-week trip. This is the first time that an UMTRI research faculty member has participated in the GIEU program. Page says that the students' diversity of backgrounds will serve them well when they interact with youth in South Africa.

"Participation in the tour will help the U-M students realize that road safety cannot be taken for granted," said Page. "By interacting with South African children and youth, the U-M students will gain some insight into the attitudes of South Africans toward road safety and understand that behavioral change does not necessarily follow from the acquisition of knowledge."

Road safety is a chronic problem in South Africa, explained Page, who cited poor driver behavior, DUI offenses, and pedestrian infractions including disregard for safe crossing places. The U-M students will engage in community-based programs to promote road safety to young people as a way to improve future

conditions and influence new generations of road users.

The students became interested in the trip partly due to Page's promotion of the importance of road safety in economic development and the fact that UMTRI is a center of excellence in this area. Five of the students visited UMTRI in early May to tour the facility and meet with a variety of UMTRI faculty and staff. Afterward, the students visited two elementary schools in Ann Arbor to interact with children while discussing road safety.

Ideally, these types of interactions will spark a long-term interest in transportation topics among some of the students, said Page.

"Their visit to UMTRI and subsequent tour of South Africa is all the more interesting with the possibility that one day they could view transportation research as a potential career opportunity," he said.

While in South Africa, the students will stay with local host families and will have the opportunity to visit places of interest, including Kruger National Park, Union Buildings, and Mandela House in Soweto.

The U-M students include Jake Bowman, Dia Bright-Johnson, Logan Chadde, Joel "Chaim" Frenkel, Munmun Khan, Agnes Kucharski, Annalise Latting, Jimmy Li, Xun Miao, Sarah Osman, Stephanie Soliz, LaDiamond Stanley, Semhar Tesfai, Avi Wolf, and Cheng Zheng. Student fellow Jen Cowhy will assist Page in leading the tour. [RR](#)



OLIVER PAGE/UMTRI

Most UMTRI reports are available in full text online. See the website address at the end of the citation. Please contact the UMTRI Library at 734-764-2171 or umtridocs@umich.edu to inquire about the availability of other publications listed here.

Journal Articles

Hu, J.; Klinich, K.D.; Miller, C.S.; Nazmi, G.; Pearlman, M.D.; Schneider, L.W.; Rupp, J.D. 2009. "Quantifying Dynamic Mechanical Properties of Human Placenta Tissue Using Optimization Techniques with Specimen-Specific Finite-Element Models." *Journal of Biomechanics*, vol. 42, no. 15, pp. 2528-2534, DOI:10.1016/j.jbiomech.2009.07.003.

Rupp, J.D.; Flannagan, C.A.; Kuppa, S.M. 2010. "Injury Risk Curves for the Skeletal Knee-Thigh-Hip Complex for Knee-Impact Loading." *Accident Analysis and Prevention*, vol. 42, no. 1, pp. 153-158, DOI:10.1016/j.aap.2009.07.014.

Sivak, M.; Schoettle, B.; Rupp, J.D. 2010. "Survival in Fatal Road Crashes: Body Mass Index, Gender, and Safety Belt Use." *Traffic Injury Prevention*, vol. 11, no. 1, pp. 66-68, DOI: 10.1080/15389580903390649.

Technical Reports

Blower, D.; Green, P. E. 2009. Truck Mechanical Condition and Crashes in the Large Truck Crash Causation Study. Report no. UMTRI-2009-9.

<http://hdl.handle.net/2027.42/64999>

The research documented in this report was sponsored by the Federal Motor Carrier Safety Administration.

Blower, D.; Matteson, A. 2009. Evaluation of 2008 Mississippi Crash Data Reported to the MCMIS Crash File. Report no. UMTRI-2010-1.

<http://hdl.handle.net/2027.42/64995>

The research documented in this report was sponsored by the Federal Motor Carrier Safety Administration.

Blower, D.; Matteson, A. 2010. Evaluation of 2008 Kansas Crash Data Reported to the MCMIS Crash File. Report no. UMTRI-2010-5.

<http://hdl.handle.net/2027.42/65062>

The research documented in this report was sponsored by the Federal Motor Carrier Safety Administration.

Dion, F.; Bowcott, S. 2009. Michigan Department of Transportation Statewide Advanced Traffic Management System (ATMS) Procurement Evaluation, Phase I: Software Procurement. Report no. UMTRI-2009-10.

<http://hdl.handle.net/2027.42/69243>

The research documented in this report was sponsored by the Michigan Department of Transportation.

Dion, F.; Robinson, R. 2009. Sweden/Michigan Naturalistic Field Operational Test, Phase 1: Benefits of Origin and Destination Information in IntelliDrive Data Sets. Report no. UMTRI-2009-23.

<http://hdl.handle.net/2027.42/69244>

The research documented in this report was sponsored by the Michigan Department of Transportation.

Green, P.E. 2009. Analysis of Data from the Thermal Imaging Inspection System Project. Report no. UMTRI 2009-38.

<http://hdl.handle.net/2027.42/65003>

The research documented in this report was sponsored by the International Electronic Machines Corporation.

Hammett, P.C.; Garcia-Guzman, L.M. 2009. Quantifying Alignment Effects in 3D Coordinate Measurement. Report no. UMTRI-2009-40.

<http://hdl.handle.net/2027.42/69245>

Jarossi, L.; Hershberger, D.; Pettis, L.; Woodrooffe, J. 2009. Trucks Involved in Fatal Accidents Codebook 2007 (Version November 18, 2009). Report no. UMTRI-2009-41.

<http://hdl.handle.net/2027.42/64489>

The research documented in this report was sponsored by the Federal Motor Carrier Safety Administration.

Jarossi, L.; Hershberger, D.; Woodrooffe, J. 2009. Buses Involved in Fatal Accidents Codebook 2007 (Version December 14, 2009). Report no. UMTRI-2009-43.

<http://hdl.handle.net/2027.42/65002>

The research documented in this report was sponsored by the Federal Motor Carrier Safety Administration.

Luoma, J.; Sivak, M.; Zielinski, S. 2009. The Future of Personal Transportation in Megacities of the World. Report no. UMTRI-2010-2.

<http://hdl.handle.net/2027.42/65001>

The research documented in this report was sponsored by UMTRI's Sustainable Worldwide Transportation program.

Sayer, J.; LeBlanc, D.; Bogard, S.; Blankespoor, A. 2009. Integrated Vehicle-Based Safety Systems (IVBSS) Light Vehicle Platform Field Operational Test Data Analysis Plan. Report no. UMTRI-2009-42.

<http://hdl.handle.net/2027.42/64505>

The research documented in this report was sponsored by the U.S. Department of Transportation, Research and Innovative Technology Administration, ITS Joint Program Office.

June

TRANSED 2010: International Conference on Mobility and Transport for Elderly and Disabled People
June 2-4; Hong Kong
www.transed2010.hk

Environment & Energy Research Conference
June 6-9; Raleigh, North Carolina
<http://cte.ncsu.edu/CTE/EEConference/index.asp>

ITS Canada Annual Conference
June 13-16; Ontario, Canada
www.itscanada.ca/ottawa2010

NARC Annual Conference and Exhibition
June 15-17, Cleveland, Ohio
<http://www.narc.org>

North American Travel Monitoring Exposition and Conference
June 21-24; Seattle, Washington
<http://guest.cvent.com/EVENTS/Info/Summary.aspx?e=af62dcfc-20d1-447e-ba4d-715e8efbdb59>

TRB Joint Summer Meeting
June 21-30; Minneapolis, Minnesota
www.trb.org/calendar

Rail Corridor Safety Conference
June 22-24; Tacoma, Washington
www.techtransfer.berkeley.edu/railroad

July

National Summit for Rural Traffic Safety Culture
July 11-13; Big Sky, Montana
<http://www.ruraltsccsummit.org/>

International Conference on Bridge Maintenance, Safety, and Management
July 11-15; Philadelphia, Pennsylvania
<http://iabmas.atlss.lehigh.edu/index.htm>

STN EXPO
July 21-28; Reno, Nevada
<http://stnonline.com/expo>

International Forum on Traffic Records & Highway Safety Information Systems
July 25-28; New Orleans, Louisiana
<http://www.ltrc.lsu.edu/atsip/>

August

National Rural ITS Conference
August 1-4, Huntington, West Virginia
<http://www.nritsconference.org/2010program.html>

ITE Annual Meeting and Exhibit
August 8-11; Vancouver, Canada
<http://www.ite.org>

Mid-Continent Transportation Research Forum
August 19-20; Madison, Wisconsin
<http://mrutc.org/midcon/>

UMTRI

RESEARCH REVIEW

The *UMTRI Research Review* is sent out free of charge, upon request. If you wish to be added to or removed from our mailing list, please send your complete address, plus e-mail address, to umtri@umich.edu.



UNIVERSITY OF MICHIGAN
TRANSPORTATION RESEARCH INSTITUTE

2901 Baxter Rd
Ann Arbor MI 48109-2150

Need to change your address?

Go to <http://umtri.umich.edu/url.plp?f>

Non-Profit Organization

U.S. Postage

PAID

Ann Arbor, MI

Permit No. 144